

## ABSTRACT

One embodiment of the present invention provides a solid oxide fuel cell, which includes:

- 5           an anode;
- a cathode; and
- an ionically conducting solid oxide electrolyte disposed between the anode and the cathode;
- 10          wherein the solid oxide electrolyte includes at least one first region having a relatively high operating temperature and at least one second region having a relatively low operating temperature;
- and wherein the composition of the solid oxide electrolyte is different in the first and second regions. Other embodiments of the invention provide methods for making and using the fuel cell, and also the solid oxide electrolyte.

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